

10/678,857

CONTAINER STRENGTHENING SYSTEM

CROSS-REFERENCE TO RELATED APPLICATION

The present application is a continuation of co-pending U.S. Patent

Application Serial No. 10/329,168 filed 12/24/02, now Patent No. 6,659,144,
which is a continuation of Serial No. 10/081,638, filed 02/21/02, now Patent No.

6,505,656, which is a continuation of Serial No. 09/812,640, filed 03/20/01, now

5 Patent No. 6,378,571 for CONTAINER STRENGTHENING SYSTEM of

Robert H. Schultz et al., which is hereby specifically incorporated by reference for
all that is disclosed therein.

FIELD OF THE INVENTION

10 The present invention relates generally to container strengthening
systems, and, in particular, to liquefied gas injection systems used to
strengthen containers.

BACKGROUND OF THE INVENTION

15 Carbonated beverages, such as soft drinks and beer, are commonly
packaged in metallic containers such as aluminum cans. The carbonation
within the beverage exerts pressure on the containers, thereby increasing
the strength of the container walls. However, it is generally desirable to
further strengthen the containers in order to decrease the likelihood of
20 damage to the containers as well as minimize the necessary thickness of the
container walls.

One method used for strengthening containers is to deposit a liquefied
gas such as nitrogen onto the beverage immediately prior to sealing the
container. After sealing, the evaporated liquefied gas creates pressure
25 within the container and also displaces oxygen from the headspace, thereby
helping to prevent spoilage of the beverage. Many devices used to
accomplish this result simply lay the liquefied gas onto the surface of the
beverage, rather than forcibly injecting the liquefied gas into the beverage.
This may suffice for non-carbonated beverages as well as some carbonated
30 beverages. However, with a carbonated beverage such as beer that tends